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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,040	03/11/2004	Lawrence C. Gunn III	LUX-P026	6702

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EXAMINER

EL SHAMMAA, MARY A

ART UNIT	PAPER NUMBER
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2883

DATE MAILED: 09/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/799,040	Applicant(s) GUNN ET AL.	
	Examiner Mary A. El-Shammaa	Art Unit 2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6/05</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 122. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-19, 24, and 26-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Luo (US 2003/0010904 A1).

Regarding claims 1 and 27, Luo discloses an apparatus and method for optically coupling light between an optical fiber and a substrate comprising a waveguide grating coupler disposed on the substrate and an optical fiber comprising a core and a cladding, with an angled tip, where the angled tip of the fiber is positioned on the surface of a substrate with the core of the fiber substantially parallel to the surface of the substrate, and the cladding on the longer side of the angled tip is adjacent to the surface of the substrate, and has a reflective surface with an angle of less than 45 degrees to the surface of the substrate, and the reflective surface is positioned adjacent to the waveguide grating coupler disposed on the substrate (*See paragraphs* [0006 – 0008, 0030, 0035 – 0046, 0051, 0053 – 0060, 0063, 0069, 0072, 0074 – 0081]).

Regarding claim 2, Luo discloses the reflection of light at the reflective surface being totally internally reflected (*See paragraphs* [0043, 0046, 0072]).

Regarding claims 3 and 29, Luo discloses a coating on the exterior of the reflective surface, where the material comprising the coating is selected from one of the following: a dielectric, a plurality of dielectric layers, epoxy, a metal and a first layer comprised of metal and a second layer comprised of epoxy (*See paragraphs* [0035, 0040 - 0041]).

Regarding claims 4 and 5, Luo discloses the metal being selected from one of the following: aluminum and gold, and the shape of the reflective surface being substantially flat (*See paragraphs* [0006 – 0008, 0031, 0038 – 0039]).

Regarding claims 6-8, Luo discloses light reflecting off the reflective surface and propagating to the substrate being a diverging beam of light, light propagating from the

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waveguide grating coupler to the reflective surface being a converging beam of light, and wherein the waveguide grating coupler couples light between the fiber and a planar waveguide disposed on the substrate (*See paragraphs* [0006 – 0008, 0042 – 0043, 0051, 0060]).

Regarding claims 9, 30, and 38, Luo discloses a flat section on the cladding adjacent to the angled tip of the fiber, where the flat section is oriented parallel to the core of the fiber, positioned on the longer side of the angled tip, is aligned adjacent to and on top of the waveguide grating coupler, and is positioned in substantial contact with the surface of the substrate (*See paragraphs* [0006 – 0008, 0040 – 0044, 0051], *see Figure 4*).

Regarding claim 10, Luo discloses the flat section forming a stigmatic lens in the optical path between the reflective surface of the angled tip of the fiber and the surface of the substrate (*See paragraphs* [0042, 0051, 0069], *see claims 23 and 31*).

Regarding claims 11-16 and 32-37, Luo discloses mechanical bonding of the fiber to the substrate, the fiber to a pedestal, and the pedestal to the substrate with epoxy and bonding the connector by one of the following: using epoxy, solder, or a mechanical bond to bond the connector to the substrate or the connector to a package enclosing the substrate and Luo further discloses a metallic coating applied to a section of the cladding of the fiber, where the metallized section of the cladding is not in the optical path of light propagating between the reflective surface and the substrate (*See paragraphs* [0035 – 0042]).

Regarding claims 17-19, Luo discloses mechanical bonding of the metallized section of the cladding of the fiber to the substrate, of the metallized section of the cladding of the fiber to a pedestal, and of the pedestal to the substrate with a material selected from one of epoxy and solder (*See paragraphs* [0035 – 0042]).

Regarding claim 24, Luo discloses the optical fiber being either a single mode fiber or a polarization maintaining fiber (PMF) (*See paragraphs* [0006 – 0008, 0030, 0035 – 0046, 0051, 0053 – 0060, 0063, 0069, 0072, 0074 – 0081]).

Regarding claim 26, Luo discloses the substrate being selected from the group comprising: silicon, silicon on insulator, silicon on sapphire, silicon on nothing, and a first layer of monocrystalline silicon, a second layer of dielectric material disposed on the first layer, a third layer of monocrystalline silicon disposed on the second layer, a fourth layer of dielectric material disposed on the third layer, a fifth layer of monocrystalline silicon disposed on the fourth layer (*See paragraph* [0072]).

Regarding claim 28, Luo discloses flattening the reflective surface by polishing the reflective surface, after the fiber has been cut (*See paragraph* [0042], *see claim* 23).

Regarding claim 31, Luo discloses propagating light through the waveguide grating coupler towards the reflective surface, and aligning the angled tip of the fiber with respect to the waveguide grating coupler by maximizing the amount of light coupled to the optical fiber through the reflective surface (*See paragraphs* [0006 – 0008, 0030, 0035 – 0046, 0051, 0053 – 0060, 0063, 0069, 0072, 0074 – 0081]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 20-23 rejected under 35 U.S.C. 103(a) as being unpatentable over Luo.

Regarding claims 20-23, Luo discloses the claimed invention except for an automated system for the alignment of the angled tip of the fiber. It would have been obvious to one having ordinary skill in the art at the time the invention was made to automate the system for alignment, since it has been held that broadly providing a mechanical or automatic means to replace manual activity which has accomplished the same result involves only routine skill in the art. In re Venner, 120 USPQ 192. The motivation to combine is to increase the accuracy of alignment while facilitating the ease of alignment.

Claims 25 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luo in view of Hoose et al. (US 6,697,411 B2).

Regarding claims 25 and 39, Luo does not disclose a PMF fiber with a mode parallel to the surface of the substrate. Hoose et al. discloses disclose a PMF with a mode parallel to the surface of the substrate (*See* col. 3, lines 13-20 and col. 6, lines 25-32). It would have been obvious to one having ordinary skill in the art at the time the invention was made, to include a PMF in the apparatus and method of Luo. The motivation to combine is to increase the accuracy of the system by the use of polarized light.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary A. El-Shammaa whose telephone number is 571.272.2469. The examiner can normally be reached on M-F (8:30am-5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571.272.2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MAE
September 6, 2005



Frank G. Font
Supervisory Patent Examiner
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